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Resource Efficiency: Japan and Europe at the Forefront

Synopsis of the project and conference results and outlook on a Japanese-German cooperation






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Content

The Wuppertal Institute for Climate, Environment and Energy and the UNEP/Wuppertal Institute Collaborating Centre on Sustainable Consumption and Production (CSCP) set out to analyse Japanese dematerialisation and resource efficiency strategies within the 3R scope and searched for options of enhancing resource efficiency strategies, commissioned by the German Federal Environment Agency. A further task of the project was to initiate a policy dialogue including stakeholders, academia, politics and Japanese and European environmental experts. The following paper summarises findings from the analyses, the results of the policy dialogues (Experts Workshop, 6 June 2007 and International Conference, 6 November 2007) and draws conclusions for a potential Japanese-European cooperation on the resource efficiency issue.

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Introduction

Both Germany and Japan have been among the leaders in the field of environmental technologies, and both are currently pursuing advancement in strategic issues of resource management. One of the objectives of the German government's sustainability strategy of 2002 is to double raw material productivity by 2020 compared to the reference year 1994. The Japanese strategy aims at improving the resource productivity by forty per cent by 2010 (compared to 1990). The 3R initiative as well as the Japanese governance structures are of interest to German resource efficiency efforts for two reasons: Firstly, national policy can benefit and learn from exchange of experiences between the two countries. Secondly, the German EU/G8 presidencies in 2007 offered a favourable opportunity for exploring and expanding international cooperation mechanisms and mutual policy learning, especially as Japan took over the G8 presidency following Germany in 2008.

1 Profile and overview of Japanese resource strategies

1.1 Specifics of Japanese environmental institutions and structures

Energy and industrial policy since the 1970s

Japan's energy policy after the oil crises in 1973 and 1978 aimed at diversification of energy sources and relieving the country's import dependency. The early implementation of the Energy Conservation Law (1979), the application of nuclear energy and a targeted price policy (high energy prices) led to unprecedented energy efficiency increases. At the same time, Japan pursued an offensive industrial policy that entailed the outsourcing of energy and resource intensive industries (and shifting of environmental pressure and employment). Both tracks considerably contributed to a dynamic development of environmental technologies and shaped today's efficiency level.

Nowadays, Japan has to struggle hard to achieve the Kyoto target of reducing its greenhouse gas emissions by 6 per cent by 2008 – 2012 compared to the 1990 level. Against the background of rising CO_2 emissions and limited abilities to pursue energy partnerships with neighbouring countries, the existence of nuclear energy is almost uncontroversial in Japan. However, Japan is looking ahead to achieve a "low carbon society" and has ambitious scenarios to reduce its CO_2 emissions by 70 per cent by the year 2050. Towards this perspective, industrial modernisation and resource efficiency are assumed to play an important role.

Relations of the ministries concerned

In January 2001, the existing Environmental Agency of Japan was transformed into a Ministry for the Environment. The Ministry bears responsibility for basic questions of environmental policy, basic environmental plans, waste, water and air pollution, nature protection and biological diversity, liability for damages and international environmental cooperation (e.g. climate change). Responsibilities, thus, have been widened compared to the former agency. The Ministry for the Economy, Trade and Industry (METI, former MITI) still retains authority for chemicals and hazardous substances, recycling, measures to combat global warming and environmental impact assessments. The latter is also within the responsibility of the Ministry for Land, Infrastructure and Transport which is also in charge of construction. Although the structural change of the institutions and the labour division among them was partly seen in a critical way by observers, the efforts for establishing a material-cycle society are characterised by a close cooperation between the Japanese Ministry of the Environment and the Ministry of Economy.

The environmental policy network

Non-governmental Organisations (NGOs) dealing with environmental issues differ considerably in memberships and manpower in Germany and Japan (Japan and the EU respectively). Technology and market development are mainly driven by industry and public administration. NGOs in Japan are less influential than in Germany / EU where alliances between NGOs and research organisations or research organisations and politics are quite common. At the same time, personnel fluctuation within the environmental network is also rather low in Japan, and the process of policy formulation is usually carried out within the triangle administration, policy and industry. Industrial policy with guidelines for sectors, thus, is quite established. Germany, however, features an established modus of consultancy, communication and cooperation between government and large interest groups which offers advantages of being open for broad participation but sometimes may seriously decelerate the policy process.

Guidelines in environmental law

Comparing policies in Europe with those of Japan, it seems that basic principles of legislation and ensuing approaches have converged to a significant extent. Also the visions on an increase of resource productivity are relatively close to each other. If it comes to specific regulations, however, differences appear that are driven by domestic institutions. Administrative guidance (*Gyosei Shido*) is a particular feature of Japanese regulation and gives a broader margin for governmental action than the German ones, and they have a strong binding character and are often dynamic. Regarding resource efficiency, this approach fosters flexible solutions serving the needs of different businesses in different phases of market development. However, some of these efforts might expose to WTO restrictions when foreign companies object competitive disadvantages caused by an opaque regulation. The comparative strength of this approach needs more analysis and should also be elaborated in systematic stakeholder dialogues (see EU attempts to improve the 'open method of coordination' and to formulate a 'sustainable industrial policy').

Market organisation – vertical integration and role of SMEs

Japan features a type of corporate organisation that is different to the Anglo-Saxon competition model of shareholder capitalism. *Keiretsu* names conglomerates of enterprises that configure industrial core competences such as the automotive industry or electronics and provide many starting points for continued efforts for material input reductions as they are often organised along value chains. They are thus characterised by a high-grade vertical integration frequently implying a firm internal organisation and the involvement of banks and assurance companies. The size of the conglomerates fosters radical innovations through easier access to capital and complementary product development as well as access to mass markets. Small and medium-sized businesses are rarely market leaders (different to Germany) though. For the emerging economies in Asia, different models of market organisation are being explored. Further research and stakeholder dialogues are needed to foster market development for resource efficiency improvements.

1.2 Dematerialisation and resource efficiency as economic and societal strategy

Political milestones and laws

In Japan, the year 2000 is regarded as a departure into *Junkangata Shakai* (sound material-cycle society). Since then Japan has been introducing a number of visions and laws that represent a conceptual turn from a throwaway society and affluent lifestyles to the principle of 3R (reduce – reuse – recycle).

Political milestones to 3R society

- **Vision** of a Recycling-Oriented Society (MITI 1999)
- Fundamental **Law** for Establishing a Sound Material-Cycle Society (EA 2000)
- Fundamental **Plan** for Establishing a Sound Material-Cycle Society (MoE 2003)
- **Declaration** of Commitment to Development of an Eco-Oriented Nation (METI 2003)
- of a Virtuous Circle for Environment and Economy in Japan 2025 (MoE 2004)
- **Cabinet Decision**: Becoming a Leading Environmental Nation in the 21st century: Japan's Strategy for a Sustainable Society (Government of Japan 2007)

This remarkable strategic decision on the governmental level is also reflected in the following laws

- Law for the Promotion of Effective Utilisation of Resources
- Waste Management and Public Cleansing Law (both superordinate laws to individual laws as follows)
- Regulations according to the characteristics of respective items:
  Container and Packaging, Home Electric Appliances, Construction Materials, Food Wastes, End-of-Life Vehicles, Green Purchasing

The Fundamental Law for Establishing a Sound Material-Cycle Society emphasises a utilisation hierarchy beginning with resource reduction, on to reuse, material recycling, thermal recycling and final disposal (cascading use). In the implementation process, Japan partly adopted and implemented the German Kreislaufwirtschaftsgesetz and the European Act on life-cycle management, but has not achieved the high-grade German resource recovery and waste recycling rates so far. However, 3R has been established as an umbrella brand for dematerialisation and resource efficiency strategies and objectives along with an advanced waste policy.

Visions and targets – accompanying measures

The major national strategy is to bring together economics and ecology and to solve trade-offs. Targets and perspectives are comparatively important in Japan. The resource productivity, recycling and waste reduction targets to be achieved via various 3R strategies and measures are stipulated in documents of both the Japanese Ministry of the Environment (MoE) and the Japanese Ministry of Economy, Trade and Industry (METI) and are thus open for a yearly performance measurement and supervision. The Industrial Structure Council – an advisory body within the METI and concerned with questions of structural change – has strongly contributed to the development of the 3R visions. The council's advantages are its strategic position and its process-related consulting. There is no equivalent for this advisory board in Germany at present.

The MoE has published the targets of the Fundamental Plan for Establishing a Sound Material-Cycle Society in 2003 as follows:

Table: Targets and Indicators of Fundamental Plan for Establishing a Sound Material-Cycle Society (2000)

Indicator	Equal to	Calculated as	Target 2010 (reference year: 2000)
Inlet	Resource productivity	$\frac{\text{Gross Domestic Product (GDP)}}{\text{Direct Material Input (DMI)}}$	+ 40% (= doubling relating to 1990)
Cycle rate	Rate of reuse and recycling	$\frac{\text{Amount of cyclical use}}{\text{Amount of cyclical use + DMI}}$	+40% (= improvement from 10% share in 2000 to 14% in 2010)
Outlet	Final disposal amount	Amount of waste	- 50% (= improvement by 75% on 1990 basis)

Source: MoE 2003: 16

The market for environmental-related business has been rapidly growing in Japan in recent years and a growth of 50 per cent is forecasted, particularly in the field of recycling and energy efficiency technologies. The Ministry of Environment is expecting a doubling of the environmental market regarding pollutant control and resource efficiency. New environmental-friendly materials (biodegradable synthetics, high-performance materials, life-time extension of raw material systems, such as copper, substitution of cement by sewage sludge, incineration slag or seashell powder) are regarded as promising innovation segments. The Eco Product Trade Fair (now including some 500–600 exhibitors), the Eco-Manufacture, the Eco-Technology Exhibition, the International Industrial Cleaning Expo, the Ecobuild and the Eco-Green Tech are examples of an increasing number of trade fairs in the eco business.

Governmental councils of advisors

In Japan, most new laws, regulations and basic plans are conferred with councils of advisors (*Shingikai*) before being submitted to the Diet (parliament) as bills, thus representing the Japanese way of decision-making based on building consensus. Members of the councils consist of academics and other relevant experts called "knowledgeable persons" (*Yuhshikisha*). Their opinions during consultative processes are very influential to approve or modify the plans prepared by ministries, while they also provide ministries with the analysis of issues and guidance on policy directions. The government can expect smooth implementation of approved laws and regulations without strong resistance, while business can influence the making of the legislation. At the same time, there is some inefficient overlapping between different councils and the concentration of political influence onto a limited number of experts, which bears risks that should be avoided through involvement, and participation of stakeholder groups.

Three independent councils are most relevant to resource efficiency:

- **Central Environment Council**: consultative body for the Environment Minister; 30 experts, a majority of which are university professors, others are representatives from industry associations, consumer organisations, the media, research institutes, trade unions, NGOs.
- **Environmental Committee of the Industrial Structure Council**: an official organisation that responds to enquiries from the METI on important topics relating to METI's policy; 30 members in Industrial Structure Council, of which about half are business representatives, others are university professors, consumer advisors, from media, public and private research institutes.
- **Advisory Committee for Natural Resources and Energy**: deliberation of the Energy Basic Plan and other important issues related to stable provision and import of energy resources; 28 members (as of October 2006), about half of the members come from academia and the rest is from businesses, local government, consumer organisations, etc.

All committees were established in 2001.

Funding for resource efficiency investments

The financing scheme of the Development Bank of Japan (DBJ, established in 1999) has three main investment groupings, which are Community Development, Creation of New Technologies and Industries and Environment and Sustainable Communities and provides funding for eco-efficiency under the Loans for the Promotion of Environmentally Conscious Management programme, as part of the Environment and Sustainable Communities investment grouping.

For direct loans under this programme, DBJ conducts qualitative evaluation of company goals, structure and efforts for the environment and quantitative assessment in terms of eco-efficiency and resource productivity. This environmental rating determines which of three interest rates the company is eligible for. The approximately 120 screening questions assess the company's endeavours in three areas: (1) environmental performance, quantitatively measuring the company's efforts to reduce greenhouse gases and waste; (2) overall management, assessing compliance and information disclosure; and (3) business activities, evaluating the company's entire supply chain from procurement and manufacturing to distribution and sales. After selecting a company for new loans,

the bank will continue monitoring its management situation. DBJ also involves private banks as intermediaries between DBJ and companies.

Under the Promotion of Environmentally Conscious Management scheme, DBJ has extended financing to 64 companies, totalling approximately 85 billion yen (543 million EUR) in the financial year 2005. The selected companies were primarily from the manufacturing sector (60 per cent) and the finance and insurance sector (20 per cent). Across its portfolio, DBJ reports 118.8 billion yen (759 million EUR) and 137 cases in programmes marked as environmental loans and investments. "Environmental loans and investments in a broad sense" totalled 220 cases for a value of 297.8 billion yen (1.903 billion EUR) in 2004.

Although the DBJ only started the Promotion of Environmentally Conscious Management investment schemes in 2004/05, the concepts and tools of eco-efficiency assessment for investment are already proving very successful in supporting companies moving towards improved eco-efficiency. There is reason to assume that eco-efficiency will be taken up as a criterion for loans by other Japanese and international banks. The German KfW Bankengruppe has several programmes directed at environmental investments. However, in terms of eco-efficiency and support for progressive companies in this field, no specific programmes exist so far. Similarly, German private banks have mechanisms to assess ecologically risky investments but no mechanisms to reward eco-efficient enterprises.

Japan Forum on Eco-Efficiency (JFEE)

The Japan Forum on Eco-Efficiency (JFEE) was established in 2004 as one of various initiatives under the Japan Environmental Management Association for Industry (JEMAI), which was formed in 1962 and has approximately 1,000 member companies. The JEMAI organises a wide range of industry environmental initiatives including inter alia, technology transfer, hosting the Life Cycle Assessment Society of Japan, developing eco-labelling schemes, hosting eco-product fairs, developing and promoting the methodologies for Design for Environment. The JFEE was founded as part of JEMAI's initiatives to contribute to Japan's overall 3R strategy.

As of September 2006, there are 46 companies and industry associations participating in the JFEE along with 13 individual members from academia. Main companies driving JFEE activities are ICT companies but they also include representatives from oil, chemical, telecom and automotive industries. Professor Ryoichi Yamamoto of Tokyo University chairs the JFEE. The goal is to promote eco-efficiency among Japanese companies.

The main aim of the JFEE is to develop de facto standards for calculating Factor X, keeping in mind the fact that the diversity of existing indicators should not be lost. The JFEE considers that the standardised indicators would become powerful tools that enhance the competitiveness of Japanese eco-products in global markets and also prove useful for purchasers and consumers.

The JFEE concepts and tools of eco-efficiency assessment are still in the developmental stage. However, industry-driven environmental initiatives such as the JFEE are backbones of the success of Japanese business in improving resource efficiency, encouraging the industry to identify the best solutions by themselves and to take voluntary actions in the areas where it is difficult for the government to intervene.

2 Spotlights – Selected policy instruments to promote resource efficiency

Four approaches of the Japanese environmental policy turned out to be significant in the course of the project "Resource strategies in Japan" and were analysed in detail.

2.1 Market introduction: Top Runner Programme

Promoting resource efficient appliances

The Japanese Ministry of Economy, Trade and Industry (METI) created the Top Runner programme in 1998 as part of the New Energy Conservation Law for improving energy efficiency in energy-using products. METI's Advisory Committee for Natural Resources and Energy sets the overall policy framework for targeting 21 product groups in the residential, commercial and transport sectors. Emissions in these sectors have increased significantly since 1990.

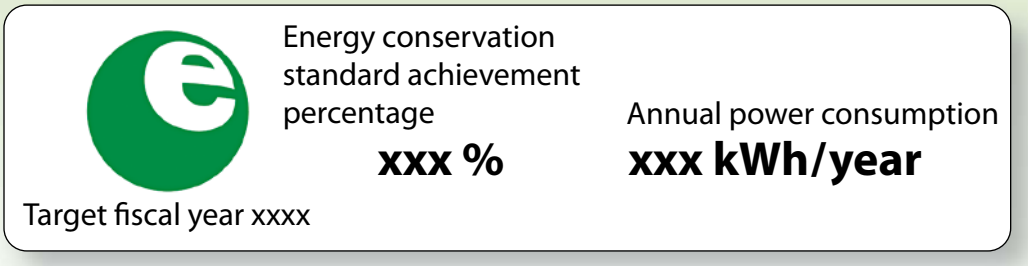
One energy efficiency target for all products within a product group would not be feasible as they are of different size or weight and have different functions. Therefore, each product category is further divided into several sub-groups, and an energy efficiency target for each sub-group is set. Targeted industries are the car industry (automobiles are classified according to weight), the household and office appliance industry (for example, photocopy machines are classified according to the number of sheets copied per minute) and the ICT industry.

The best as standard – dynamic performance requirements

In terms of setting standards, the most important characteristic of the Top Runner programme lies in its focus on the supply-side of product markets. It "represents a purely regulatory approach administered by METI without any kinds of government incentives" (Schröder 2003). Instead of setting a minimum energy performance standard (MEPS), the current highest energy efficiency rate of the products in each sub-group is taken as a standard (the "Top Runner"). This standard represents the target value of energy efficiency within the sub-group that has to be reached within a certain time frame. The standard can be set even higher than the highest energy efficiency currently achieved and performance targets are continuously updated. The latest targets were set in February 2007 for passenger vehicles and freight vehicles of less than 3.5 tonnes.

The Energy Efficiency Standards Sub-committee under the Advisory Committee for Natural Resources and Energy determines the targeted product groups. Standard levels and the according time frame to achieve the target are agreed upon and revised through extensive consultative dynamic processes involving several stakeholder groups (manufacturing industry, universities, trade unions and consumer groups). Negotiations over Top Runner standards are preferably

Caption: The e-Mark labelling



Source: *Voluntary energy-saving label image, Japan*

conducted with individual manufacturers than with product branch representatives who might defend interests of the least performers (Tojo 2005).

By means of The Energy Conservation Law all manufacturers and importers are obliged to achieve the respective target by a specified year. The Agency for Natural Resources and Energy (under the METI) monitors the results after the expiry of the time given to achieve the target.

To promote products compliant with the current Top Runner standards, the voluntary e-Mark labelling scheme has been introduced which shows in percentages if the product has achieved the energy efficiency performance of the Top Runner. Even though labelling is not mandatory, a vast majority of manufacturers use this label.

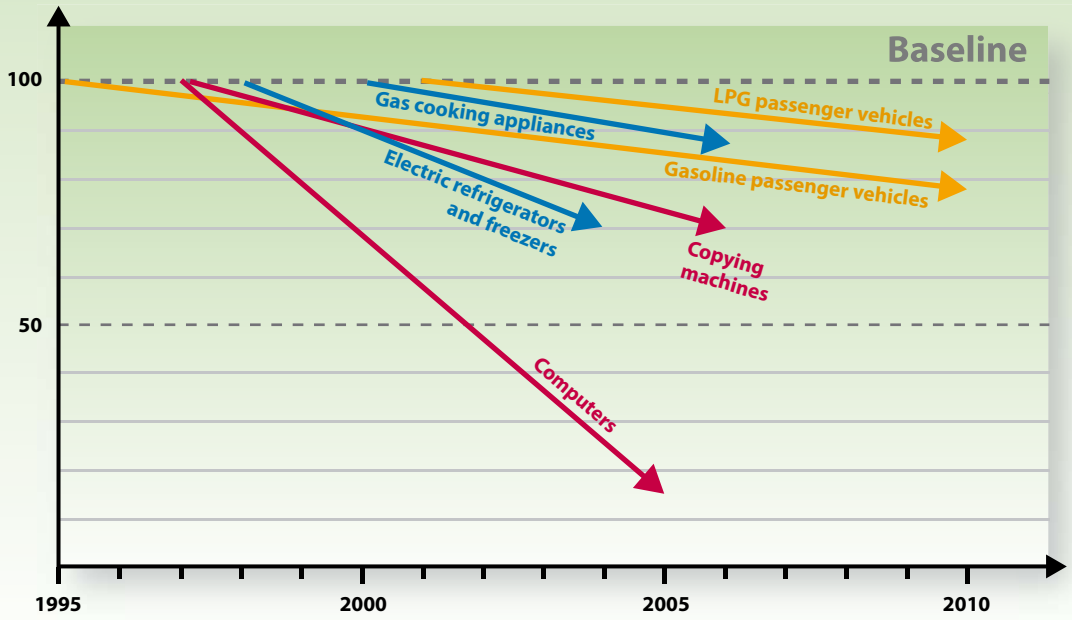
In cases of non-compliance with the set target, METI issues a 'recommendation' to the company, sometimes followed by an order to comply. METI might also restrict sales of products in shipping volume according to production and import volume. However, no sanctions have been reported to date under the Top Runner programme (Nordqvist 2006). While concerns have been raised about potential breaches of WTO regulations due to also targeting importers, no complaints have surfaced so far.

Moving the market? The success of the top-runner

In terms of timing, the target setting according to the most energy-efficient products permitted to define Top-Runner targets in just half a year, compared to a process taking many years in the EU where standards are set according to lowest life-cycle cost.

There is a broad agreement among Japanese stakeholders that the Top Runner programme has been effective. The energy efficiency of videotape recorders improved by 73.6 per cent between

Overview of Top Runner targets



Source: *CSCP based on Nordqvist 2006*

1997 and 2003 (expected 58.7 per cent). Personal computers achieved their Top Runner standard well before the target year 2002. However, for a detailed impact analysis comprehensive quantitative information on energy saving achievements in Japan based on the Top Runner programme would be required. This information is not publicly available, only ex ante estimates of savings that only include relative numbers. Although estimates of the quantitative significance vary, expectations by Japanese stakeholders seem to fall within the range of 16-25 per cent of the entire national savings target by 2010, which totals about 2,000-2,500 PJ (Nordqvist 2006).

Product catalogues are published twice a year and show a good overview of their Top Runner performance. Information about the penetration of products, however, is missing, further adding to the difficulty of estimating the net energy impact. Sales statistics are collected at the end of the respective compliance period, again, this information is not publicly accessible.

Drawbacks of the Top Runner approach include the following:

- New products that have not been targeted yet by the programme (like plasma TV sets) might crowd out conventional products.
- 'Good' negotiations from the perspective of manufacturers can lead to long compliance periods and to targets that can be easily achieved.
- Setting targets for a wide range of complex products with many characteristics can be an administrative burden.

Top-runner elements applicable in the German / European context

The Top Runner programme is designed to provide flexible incentives for actors on the supply-side and ensure that all producers can realistically fulfil the standards. The importance of having differentiated standards for vehicles on a weight basis and screen-size for TVs are examples of such incentives that motivate companies to commit themselves to improving energy efficiency and that can help to shift the whole market towards efficient products. Furthermore, the fulfilment of standards by *individual* companies – the approach taken in the Top Runner programme – provides more motivation for a change of product design than an industry-wide mandate of minimum performance standards often used in Germany and the EU.

The relevance of the Top Runner approach has to be seen in the light of the existing European regulatory framework, particularly the Energy-using Product (EuP) Directive. For adopting the Japanese Top Runner programme, some of its features may need to be altered (Nordqvist 2006):

- The sanction system has to be adapted to local conditions.
- Standard-setting procedures in a European Top Runner programme would have to make sure that companies, which have to participate under different national schemes, are not unnecessarily subjected to conflicting requirements.
- It is far from self-evident that European manufacturers would be as compliant as their Japanese counterparts in participating in the extensive standard-setting exercises that have been successful in Japan.

Issues that might complicate an adoption at the EU level include the size of the EU market and the heterogeneity of member-countries' consumers habits, cost of setting specific targets, inconsistency with a least cost approach to energy use and CO_2 emission reduction, possibility of manufacturers colluding to undermine efficiency improvements, and no legal discrimination on the basis of size or the financial capability of manufacturers/importers (Brisaer 2006).

Comparing the Top Runner programme with the EU Energy Label, the German Electrical and Electronics Industry (ZVEI) states that in the case of refrigerators the energy use of the Top Runner standard would be much higher than that of the A++ Energy Label (Scholz 2006). In case of applying the Top Runner approach in the EU, it would be therefore critical to set the standard at a more ambitious level than the average of the current EU Energy Label standard.

One of the decisive factors for the Top Runner programme is the strong involvement of stakeholders (industry and others) and their acceptance, willingness and capability to co-operate, especially during the time-consuming target-setting phase. While the possibility and advantages for the EU to adopt the Top Runner approach is highly debated on the political and scientific level, several options are worth exploring:

The Top Runner approach could be applied for (life cycle-wide) material intensity, as it would include production and end-of-life impacts not addressed by the Japanese approach. By doing this, it has to be kept in mind that the applied methodology has to be feasible across a wide range of products and that targets have to stay commercially viable. The EU could also adopt only elements of the Japanese Top Runner programme. Those include:

- **The dynamic process of setting and revising standards**. Current labelling programmes do not set strong incentives for further improvements once products reach the highest category (A++). The dynamic approach embodied in the Top Runner programme would avoid these problems and allow promoting continuous innovation. 'Dynamic performance requirements' are one element currently discussed for the upcoming EU SCP Action Plan (EC 2007, CSCP EEA, RoS 2007).
- **The step-by-step extension of product groups**. The Top Runner programme now covers a wider range of product groups than the corresponding European approaches. It does so under a common framework that has proven flexible enough to take the differing nature of these product categories into account. This includes regulating the energy (CO_2) efficiency of new cars now discussed on the European level, a product group that has been already addressed by the Top Runner programme back since 1995.

These important elements should become a topic in the European consultation and implementation process related to the EuP Directive and its implementation.

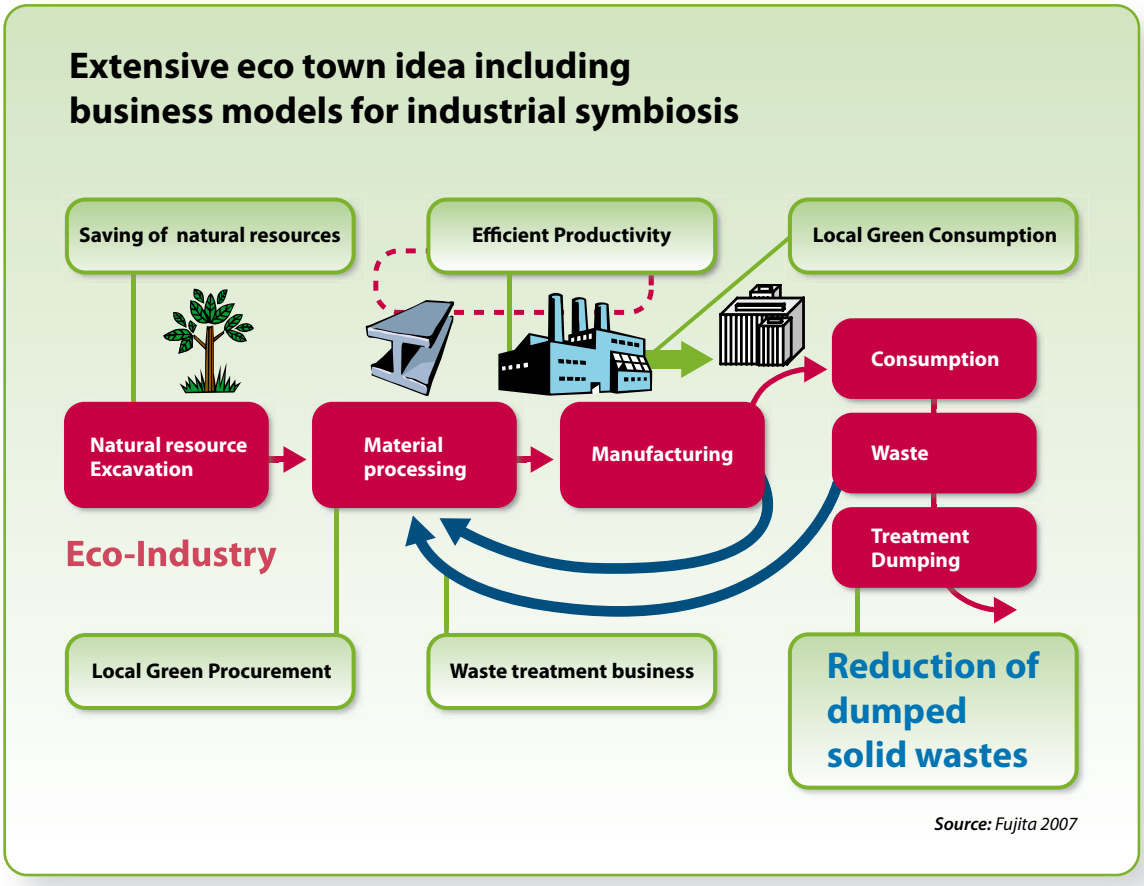
Panel discussion at the International Conference "Resource Efficiency" in November 2007 at German-Japanese Center Berlin.
From left: Nobuyuki Hiratsuka, Michael Kuhndt, Yasuhiko Morita, Raimund Bleischwitz, Atsushi Inaba.

2.2 Regional and local pioneers: Eco Town Programme

Decreasing resource input by intelligent waste management

The main objective of the Eco Town Programme is to reduce resource use by intelligent waste management systems within designated areas. Synergies between urban/regional and environmental planning shall be used by jointly applying them to the management of resources input, waste, environmental protection measures and industrial and economic development at the best possible rate. Industry, businesses, communities and residents of those designated areas ideally optimise their resource use in public-private partnerships through recycling in production processes, exchange of recyclable materials among industrial enterprises and among industry and households.

The concept is related to eco-industrial parks and industrial cluster concepts, the focus is on industrial systems, 3R (Reduce – Reuse – Recycling) and life cycle economics. The programme, however, has become part of the Eco-City concept that deals with overall urban planning and urban ecosystems, civil society and the greening of cities (Guilamo 2007). Besides the main environmental objective to improve the resource productivity within a particular Eco Town area,



secondary economic objectives like revitalising particular industry sectors, strengthening the eco business, revitalising certain industrial areas and fostering competitiveness and social objectives like increasing participation of citizens are also significant.

Two ministries act in concert

The Ministry of Economy, Trade and Industry (METI) and the Ministry of the Environment (MoE) together hold the competencies concerning the approval of the project status and the allocation of supporting funds. Projects have to fulfil a certain standard of originality and innovativeness, they should serve as a model for other municipalities and support the application of best available technologies in the field of resource efficiency. Eligible are technologies that contribute to a material cycle society. MoE and METI together approve the status of the project and grant financial aid to private organisations as well as municipalities.

The programme is a fiscal policy instrument (subsidy system). It is a stakeholder-oriented approach that aims at a comprehensive involvement of industry, citizen groups and local governments in the planning process. The recipients of the subsidy are municipalities or regions (or prefectures respectively) and private organisations. A region or a town applies for funds by developing and submitting an Eco Town plan that considers the context of the region's specific characteristics and advantages. All resources, all sectors and businesses and all sorts of products can be integrated in an Eco Town development plan. Besides the subsidy system of the national government (MoE and METI), some local governments established additional subsidy systems on municipal level. Furthermore, the Development Bank of Japan provides loans for 3R investments.

The Eco Town Programme is flanked by the Law for the Promotion of Effective Utilisation of Resources (originally enacted as the Law for Promotion of Utilisation of Recyclables in April 1991 and amended in June 2000) that designates 10 industry sectors and 69 products, which cover about 50 per cent of the generated municipal and industrial waste, aiming at the utilisation of used parts and recycled materials and the integration of 3R considerations into the product design (Clean Japan Center 2005). Further individual recycling laws are the Containers and Packaging Recycling Law, the Electric Household Appliance Recycling Law, the Food Recycling Law, the Construction Material Recycling Law and the Automobile Recycling Law. These laws came into effect in the years 2000 to 2005.

Efficient utilisation of facilities remains challenging

Since implementation in 1997, 26 towns have been approved as Eco Towns (as of 2006). In 2004, the Japan Government spent a total amount of 1.43 billion Yen for hardware projects and 110 million Yen for software projects (Guilamo 2007; GEC 2005). This amount corresponds to approx. € 350,000 on average for each Eco Town. Despite those rather limited subsidies, the Eco Town Programme is regarded as being successful in Japan.

A survey conducted by the Environmental Development Study Group (founded by METI in 2003) examined the appraisal of recycling facility operators regarding the implementation process of Eco Towns and necessary upgrade measures. This study found, however, that many of the respondents expressed difficulties particularly in the field of supply with recycling materials, in

terms of quantity as well as quality. The improvements of the quality of the recycling materials supplied (47 per cent) and even to a greater extent the quantity of supply (under-utilisation of facilities) (74 per cent) are two remaining major challenges expressed by the interviewees for the future of Eco Towns. Regarding the project costs, operators pointed out to high maintenance costs of facilities (68 per cent), high charges for non-recyclable residual waste (34 per cent) and a necessary increase of productivity (34 per cent). Concerning the resale of recycling products, the majority of the respondents mentioned the expansion and the securing of the market (68 per cent) and emphasised the development of new application fields (39 per cent). The implementation problems were referred to as 'more difficult than expected' (The Environmental Study Group 2004).

The recycling rate of municipal solid waste was about 18 per cent and 49 per cent for industrial waste in 2003 (MoE 2006 and 2005). According to MoE figures of 2007, the final disposal rate of both wastes decreased significantly in the years 2003 and 2004 (see detail analysis on Material Flow Indicators in Japan in this report).

Afflatus for industrial cluster concepts and zero waste management in Germany / Europe

As the programme predominantly supports the installation of (large) recycling facilities on a local basis, which are large-scale implemented in Germany, the programme seems to deliver only a limited impulse for German approaches. In fact, Germany is regarded as being very progressive in recycling management in Japan. The programme, however, goes beyond e.g. 'Eco-Profit' or LA 21 in terms of both public funding and technology deployment. The idea of the eco-industrial parks has been expanded to residents and communities and Japanese industrial clusters that are utilised (Nagasaka 2005).[1] The successful implementation of these concepts is being facilitated through dense population, geographical closeness of industry, business and settlements and a highly developed transport infrastructure. The Eco Town Programme could serve as a model for resource efficiency projects within communities and urban planning on a conceptual basis for many yet not ecologically aligned industrial parks in Germany and Europe. In this context, the evaluation concepts for the industrial symbiotic collaboration within Eco Towns such as Kawasaki are of particular interest as they combine spatial planning with material flow analysis.

At present, there are only a few coordinated policies for industrial settlements and communal policy instruments in connection with waste management in Germany and Europe. The Japanese programme has strongly contributed to a structural transformation process of former areas of heavy industry or major industrial areas. The programme considerably benefits from the infrastructural clustering of the involved organisations and enterprises (see e.g. Fülop 2007). Due to these ambitious plans and visions, Japan is promoting the Eco Towns and they are advertised as attractive business fields for German and European investors who are active in the waste management and recycling business. Hence, they are interesting for a possible exchange of cutting-edge technologies between Germany/Europe and Japan (JETRO 2006).

1 Due to estimations there were also 60 eco-industrial parks in Japan in the year 2000 (Morikawa 2000).

2.3 Public and private organisations: Green Procurement

Greening products and services procured by government organisations

Green procurement has been considered to be one of the most successful environmental initiatives in Japan (ICLEI Europe 2001). Decisive success factors of the Japanese approach to public green procurement are a well developed legislative framework (Green Purchasing Law and Basic Policy), the availability of product-related online information and the active involvement and experience of the civil society and industry through the Green Purchasing Network (GPN).

Binding directions and diversity of labels for green procurement

At the national government level, the first green purchasing initiative was the 1994 Action Plan for Greening Government Operations. The programme was succeeded by the Law on Promoting Green Purchasing from 2000. The law required the national government to define a Basic Policy on Green Purchasing, released in 2001, and has the goal to outline the basic direction of public procurement of eco-friendly products. The law makes it obligatory for ministries, agencies, the Diet (parliament), courts and other governmental institutions to implement green procurement, while local authorities, private companies and individuals are encouraged to make efforts for green purchasing. The law gives the Minister of the Environment (MoE) the authority to request the head of each ministry or agency to take measures which are deemed particularly necessary to promote the procurement of eco-friendly goods.

The basic principles for procurement of eco-friendly items outlined in the Basic Policy on Promoting Green Purchasing are as follows:

1. Environmental attributes should be considered in addition to price and quality
2. Consideration from environmentally diverse viewpoints including environmentally sound material cycle and of greenhouse gas emissions reduction
3. Consider reducing environmental impacts throughout the product's life cycle
4. Commit to long-term use, correct utilisation, and appropriate disposal of procured goods and services

The Basic Policy outlines designated procurement items and evaluation criteria for 15 product categories, public works and services with 214 different items as well as guidance for lumber products to prevent illegal logging. The criteria are revised through a 'public comment' process by the end of every fiscal year (last updated February 2007) in response to the development and popularisation of the goods and improvement in scientific understanding. Furthermore, the government provides guidelines on appropriate information methods on eco-friendly goods and services through a database of eco-labelled products and their environmental data to facilitate the choice of environmentally sound products set up by the MoE.

The government's green procurement legislation and standards were largely influenced by civic initiatives, especially by the Green Purchasing Network (GPN), set up in 1996 by 84 organisations that responded to a request for participation from the MoE. The government's purchasing criteria were initially developed based on the GPN guidelines and the 'Eco-Mark' labelling scheme, set up in 1996. Today, the GPN is a multi-stakeholder network with 2,900 member organisations, including 2,300 companies. The GPN has drawn up principles of green procurement and procurement guidelines for each type of product (16 product categories and more than 11,000 products as of January 2007). Since 1997, it publishes a 'data book' of quantitative and qualitative environmental information on each product in accordance with the procurement guidelines. The information provided through the GPN online database is widely used and records more than 300,000 page views per month.

Compliances higher at the national than at the local level

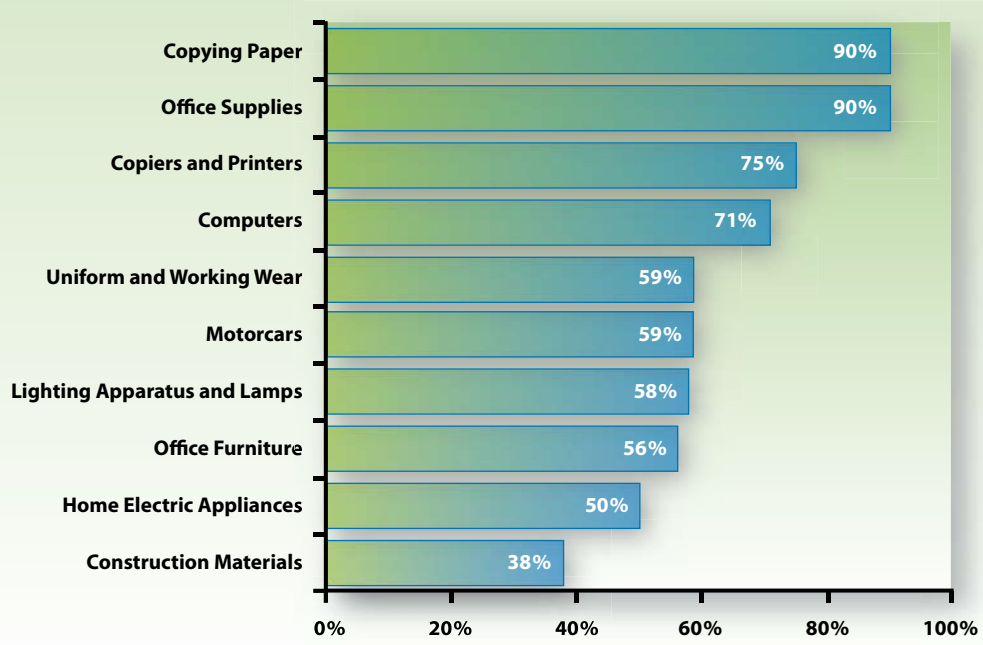
According to the MoE, the development of green purchasing policies by public and private sector organisations was accelerated by the enforcement of the Law on Promoting Green Purchasing. All 47 prefecture governments had developed procurement polices by 2005. On district and town level the pick-up is slower (45.4 per cent and 10 per cent compliance respectively in 2006), therefore, the MoE has set the goal to systematically implement green purchasing in all local government agencies through special guidelines in 2007 (Harada 2006). In 2004, 29.4 per cent of Japanese public companies made efforts to purchase eco-friendly goods and 38.4 per cent were in the process of considering or developing policies. 21.7 per cent of private companies were purchasing eco-friendly products in 2004 and 33.1 per cent were in the process of considering or developing policies to this end.

According to a GPN survey conducted in 2003, the product related information used by green institutional purchasers shows that the original "Eco-Mark" continues to be the most important information reference for green purchasing used by 88 per cent. The GPN Guidelines/Databases are used by 48 per cent. The criteria of the Green Purchasing Law are only used by 33 per cent of the institutional purchasers (Koshibu 2003).

In 2003, 58 per cent of 722 suppliers responded "sales amounts of green products have increased in the past year". Domestic market size of green products is roughly estimated as 50 trillion yen (Sato 2007). Particularly advanced product categories of green purchasing are papers, office supplies, office furniture, OA & IT equipments, motorcars, uniforms and electric appliances. For example, the market share of refillable ballpoint pens increased from 13 per cent in FY 2000 to 43 per cent in FY 2004. Since the end of FY 2004, low emission vehicles have replaced all official vehicles. Green purchasing principles have also influenced the automobile market, Star-3-efficiency standard vehicles accounted for more than 80 per cent of all newly purchased low emission vehicles in 2005.

Japanese policy developments have had spill-over effects on international green purchasing initiatives. In 2005, Korea has implemented the "Act on the Promotion of the Purchase of Environment-Friendly Products" (the Act) which is in many respects similar to the Japanese Law on Promoting Green Purchasing. A similar development is taking place in China where the State Environment Protection Agency (SEPA) published the "Implementation Guidance on Govern-

Product Areas where Japanese Institutional Purchasers practice Green Purchasing



Source: Sato 2007

ment Procurement on Environmental Labelling Products" in October 2006 to be implemented nation-wide in January 2008. In order to enhance green procurement activities worldwide, the GPN initiated the International Green Procurement Network (IGPN) in 2005, with networks in other countries and the ICLEI.

Inspiration for fostering green procurement in Germany / Europe

Green procurement activities are more developed and systematised in Japan than in the EU and Germany. German public spending accounts for around 17 per cent of the country's annual GDP (Clement 2007), therefore, the potential of the public sector to influence businesses and private consumers through its purchasing power and green procurement is substantial. No legal barriers to carry out public green procurement in Germany exist as the European Directives for procurement state that environmental aspects should be taken into consideration. Germany could implement a more comprehensive programme requiring all governmental institutions to implement green procurement, based on the Japanese legal and institutional framework. Currently, important barriers to this include missing valuable experience and information about how to do green procurement in practice. Specific examples are:

- No mechanism to determine and track the effectiveness of government green procurement efforts exist (e.g. reporting and monitoring system)
- No achievement targets for levels of government green procurement are set
- Procurement officials lack information and clear guidelines about how to develop and apply environmental criteria on green procurement

As Korea and China have successfully implemented green public purchasing legislation modelled after the Japanese processes and measures, the possibility of transferring Japanese green purchasing instruments to Germany exists as well. Several issues would need to be considered for the German context:

- Based on a PDCA (Plan-Do-Check-Act) model like ISO 14001 environmental management system, the Japanese legislation guides governmental institutions to ensure embedding green procurement into their day-to-day procurement activities. This way of legislation design could be transferred to Germany. The Eco-Management and Audit Scheme (EMAS) could be applied as a suitable instrument in the European context.
- Japan's utilisation of voluntary initiatives engaging the industry could be encouraged in Germany.
- It is not clear how advanced German public institutions would be as compliant as their Japanese counterparts in implementing voluntary green procurement guidance. Alternative designs and processes may be more conducive to the German institutional environment. Specific incentives and enforcement mechanisms to ensure compliance might be needed.
- Germany can learn from the way that green procurement activities and the GPN were developed through a multi-stakeholder process and utilise Japan's lessons for encouraging German industries and civil society organisations to take more active roles in green public purchasing issues. In Germany, a network similar to the GPN does currently not exist, however, it could draw on the experiences of the European Green Purchasing Network (EGPN) and the Procura+ initiative.
- Eco-Mark and the GPN guidelines have remained important sources of information for public purchasers in Japan. Established and well-known eco-labelling schemes in Germany providing product information that would be most relevant for green procurement are the German eco-label "Blauer Engel" (www.blauer-engel.de) and should be taken into account when setting up public procurement guidelines.

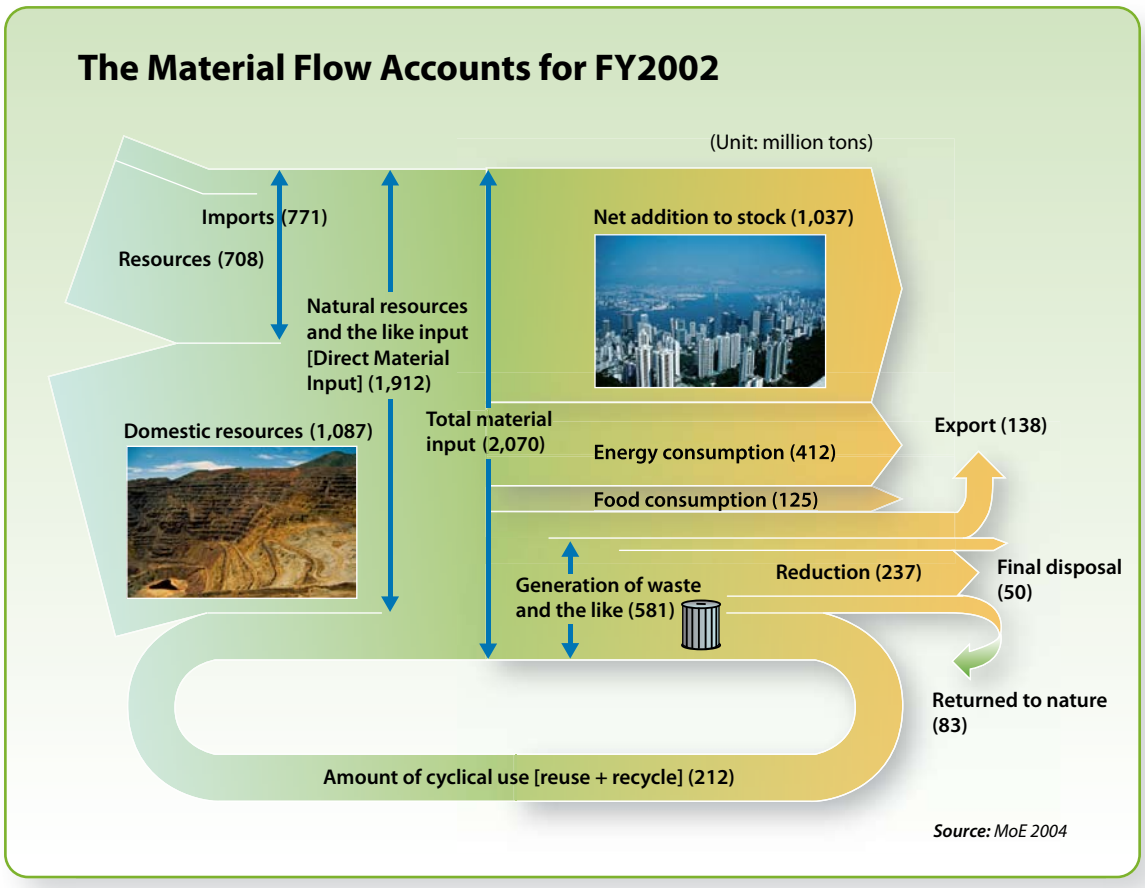
The Japanese experience could also be covered by the information exchange about Green Procurement issues under the Marrakech Process Task Force for Sustainable Public Procurement (Markova 2006) to make the best practice examples, developed in Japan, internationally available. The EU Commission also discusses to further strengthen Green Public Procurement within the European Union through its upcoming Action Plan on sustainable consumption and production; if a compulsory or a more indicative path will be chosen, is still open (EU 2007).

2.4 Measure what you manage: Performance Indicators for Natural Resources

Reducing complexity by pertinent indicators

Material Flow Analysis or Accounting (MFA) has been developed and applied to describe the flow of materials of resources, products, wastes and emissions in a systematic way. Implemented for the description of economy-wide, sector, regional, company, process and product related material flows, MFA can contribute to the improvement of resource productivity and environmental efficiency while providing the basis for benchmarking within the different monitoring systems. Consistent international indicators can foster international comparison and joint efforts. The figure below shows the economy-wide material flows of Japan for the fiscal year 2002.

The policy relevance of material flow indicators for Japan is high: due to 1. the high dependency on the import of natural resources, 2. the environmental pressure associated with mass production and consumption, 3. increasing problems with growing volumes of solid wastes and disposal shortages (Moriguchi 2006). Hence, Japan is dedicated to the advancement of material flow indicators and implementation at the macro, meso and micro level.



Connecting 3R policies and dissemination activities

Amongst the material flows indicators that are available (e.g. Direct Material Input, Total Material Requirement, Domestic Extraction, etc.) three indicators were selected and closely related to 3R policies (Reduction – Reuse – Recycling). The Fundamental Plan for Establishing a Sound Material-Cycle Society of 2003 thus introduced material flow indicators for observing the overall implementation success of the 3R strategies on the national level (green procurement, effective utilisation of resources, waste management, food and packaging recycling, etc.). The fiscal year 2010 is the short-term target line and 2020 is the medium-term perspective. 1990 and 2000 (Government of Japan 2003)[2] are the reference years (base line). The quantitative targets of the Fundamental Plan are ambitious. Resource productivity is formulated as the ratio of Gross Domestic Product (GDP) and Direct Material Input (DMI) and is termed as 'Inlet' (identical to the OECD indicator). On the basis of 2000, an increase of resource productivity by 40 per cent is to be achieved. The second indicator called 'Cycle rate' is composed as the ratio of the "amount of input from recycled and reused material" and "amount of input from recycled and reused material" plus Direct Material Input (DMI). This rate is to be increased to 14 per cent by 2010. The third indicator is called 'Outlet' and counts the wastes that are not recyclable or reusable. They should be reduced by 50 per cent by 2010. Furthermore, the quantity of municipal solid waste discharged from households per person and day is to be reduced by 20 per cent from 2000 on (Moriguchi 2006).

At the enterprise level, Environmental Accounting practices are led by two governmental initiatives. The Ministry of Environment released the 'Environmental Accounting Guidelines' were published in 2000 and the 'Eco-efficiency and Factor Handbook for Products' in 2004 (JEMAI 2004) as part of a project of the Ministry of Economy, Trade and Industry. The overall objective is to improve material efficiency for economic *and* environmental reasons (Nakao et al. 2005).

In 2003, Japan proposed launching an international joint research project on Material Flow Accounts (MFA) and Resource Productivity (RP) at the G8 Environment Ministers' Meeting in Paris. At the Evian Summit in June, G8 leaders announced in the G8 Action Plan on Science and Technology for Sustainable Development that they would enhance their understanding of resource material flows and continue to work on resource productivity indices, notably in the Organisation for Economic Co-operation and Development.

Progress and success

Since 2000, the Direct Material Input has been constantly decreasing from 1,912 million tonnes to 1,697 million tonnes in 2004. The total of cyclical use was recorded to be 213 million tonnes in 2000 and 247 million tonnes in 2004. The cyclical use rate increased from 10 per cent in the year 2000 to 12.7 per cent in the year 2004. In the same period, the final disposal has been reduced by almost 39 per cent compared to the year 2000 and 68 per cent compared to the basis year 1990. These figures show that Japan is on its way towards reducing material input and waste output. The 2010-target for the cyclical use rate (+14 per cent) is nearly achieved as well as the final disposal reduction target (-75 per cent) although there are a few more years to go until 2010. The resource productivity should be doubled by 2010 compared to 1990. The Domestic Material Input

2 The Japanese fiscal year comprises the period 1 April until 31 March in the following year.

has reached a reduction of 22 per cent so far (DMI of 1990: 2,191 million tonnes); the resource productivity was improved by approximately 51 per cent (calculated with Gross Domestic Product at constant prices of 1990)[3].

Towards comprehensible and comparable data in Germany / Europe

The implementation of the three Material Flow Analysis-indicators on the national level in Japan can serve as an example for a generally understandable observation tool for long-term targets, which are sufficiently precise and motivate for involvement, policy integration of different environmental fields and provide interim results that are revisable.

The relevance of MFA is quite high since the indicators are necessary to monitor and to guide resource efficiency. The method used in Japan is consistent with guidelines by EUROSTAT, whereas the approach followed by the German Federal Statistical Office in pursuit of the German National Sustainability Strategy was somewhat different (e.g. on biomass). Currently, both countries contribute to the further international harmonisation via the OECD MFA and resource productivity process. While Japan seems to be mainly oriented towards accounting of material flows and use within Japan, the German statistical office has started to account also for (parts of) hidden flows (based on the Raw Material Equivalent method, RME) associated with imports in order to reflect resource use more comprehensively. In general, Japan would be able to provide the same data, and both countries may even go another step further to fully account for all relevant hidden flows (incl. unused extraction in terms of TMR equivalents), as it was done in the ground-breaking Resource Flows report in 1997. The stepwise extension of the MFA indicators is already foreseen in the EUROSTAT and OECD guidelines and draft documents. Japan and Germany could push the further process of measuring and fostering resource productivity through a joint report that compares both countries on the basis of **D**irect **M**aterial **I**nput (DMI), **R**aw **M**aterial **E**quivalents (RME) and **T**otal **M**aterial **R**equirement (TMR) indicators and the related productivities. The report could also include sectoral disaggregation or selected product information in order to provide industry related information.

It would thus be important to continuously bring together experts and stakeholders in order to facilitate a process of joint MFA and resource productivity reporting. The prospect is to come up with steps to foster resource efficiency via harmonising measurement systems for both countries and industry, with a view to also trigger the international debate. For example, Japan and Germany could develop a set of common targets and indicators ("doubling of resource productivity") and promote them internationally. Proposals for the future Japanese-German cooperation:

- Conduction of a joint report that
  - compares both countries on the basis of DMI, RME and TMR indicators and the related productivities,
  - includes sectoral disaggregation or selected product information in order to provide industry related information,

3 IMF Financial Statistics Yearbook and IMF International Statistics February 2007; in 1990, Japan gained a Gross domestic Product of 430,040 billion Yen and 504,129 billion Yen in 2004 (at 1990 prices). Accordingly, Japan produced approximately 196 Yen/kg material input in 1990 and 297 Yen/kg in 2004.

Photo above: Audience and speakers at "Resource Efficiency" Conference in Berlin

Photo left: Michael Müller, Secretary of state, Germany – German keynote speaker

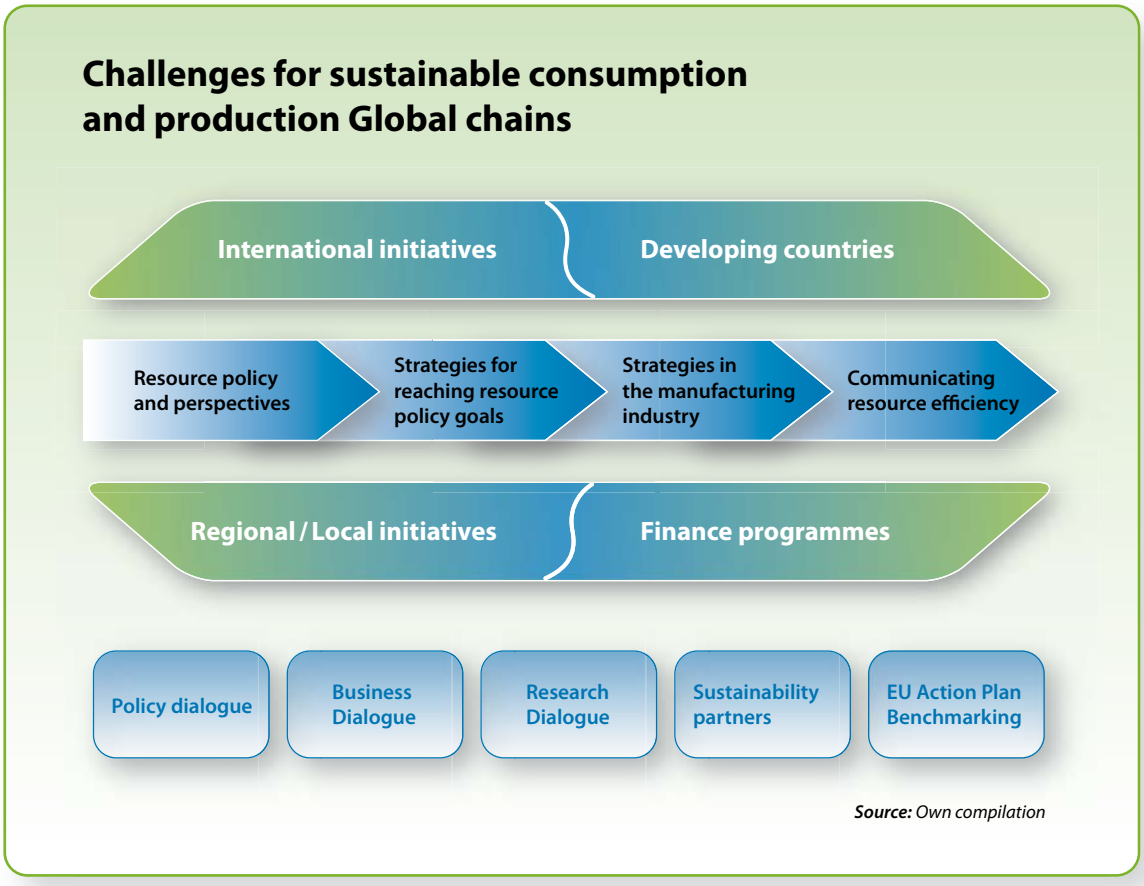
  - discusses the inclusion of biomass and hidden flows,
  - discusses relevant policies.
- The report shall be developed in conjunction with selected Japanese-German workshops on resource efficiency that bring together experts and stakeholders (including JEMAI, JFEE) and elaborate on a scenario analysis.
- These efforts shall be coordinated with and facilitate ongoing OECD efforts.

3 Outlook: Promoting resource efficiency in Japan and Germany

The policy dialogue was central element of the project. It strived for involving experts and stakeholders in the course of the project, the discussion and dissemination of the resource efficiency issue and the project results, triggered by cooperation and partnerships.

On 6 June 2007, an initial experts workshop was held in Berlin. The Wuppertal Institute and the UNEP/Wuppertal Institute Collaborating Centre for Sustainable Consumption and Production presented first project results and discussed these with experts from the Federal Environment Agency, the German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety, Universities and Chairs of Japan Sciences and further participants.

On 6 November 2007, the Wuppertal Institute and the UNEP/Wuppertal Institute Collaborating Centre on Sustainable Consumption and Production hosted an international conference in collaboration with the Japanese-German Center Berlin (JDZB), the Institute for Global Environmental Studies (IGES) and the Federal Environment Agency (UBA). This conference especially aspired to integrate experts and stakeholders from administrations, research institutions, business



Source: *Own compilation*

and industrial organisations and associations with the objective to develop options for a continued cooperation between Germany and Japan. More than 90 participants attended the conference, of which 20 were speakers or presenters. Approximately 1/3 of the participants were Japanese or had a professional background closely connected to Japan.

Our project and the policy dialogue could confirm the strong interest in the issue of resource efficiency in both countries, enhanced by increasing international perspectives and a desire to think 'outside the box'. This is a platform on which future initiatives can be built. The momentum should be maintained and utilised to systematically strengthen and establish ties between stakeholders in both countries.

Both countries are forerunners in the field of resource efficiency and dematerialisation. One should also bear in mind the ambitious climate policy in both countries aiming at a substantial reduction of greenhouse gases in the next decades (called 'low carbon society' in Japan). A strategic cooperation on these issues with EU involvement could help to relieve present practical constraints and unleash previously unseen capabilities. Options for systematic deepening and multi-stakeholder collaboration can be structured along a matrix with a horizontal axis (contents) and a vertical axis (organisational forms).

Contents of cooperation

a. Strategies for reaching resource efficiency policy goals (3Rs): Laws and other incentives on the material-cycle society and resource efficiency in the field of construction materials, vehicles, food. Exchange about flexible regulations and guidelines (e.g. green purchasing) as elements of dialogue processes: this could be promoted via policy exchange on the working level of public administration and accompanying policy analyses between German/EU and Japanese researchers with coordinated funding. Specific suggestions:

1. Joint study on effectiveness of Japan's Top Runner approach and scope for application in EuP Directive implementation,
2. exploring harmonisation between Japanese and European energy efficiency standards/ labels,
3. comparing the feasibility of modern recycling technologies and ensuing incentives for resource efficiency along roadmaps,
4. assessing the capabilities of the metals manufacturing (metal working) industry to cope with the challenge of resource efficiency.

b. Resource efficiency policy targets and perspectives: Dialogues and research on long-term targets that encourage commitment and are sufficiently clear for key actors (relevant industry, consumers, policy). They shall integrate different environmental policy fields and should provide verifiable interim results concerning material flow indicators and targets (doubling of resource productivity, Factor Four – Eight – Ten). Both countries may – in anticipation of the OECD and G8 responsibilities – pass a bilateral set of targets and indicators and communicate it internationally.

1. In addition, a joint scenario study on driving forces, trends and options for decoupling should be undertaken (see e.g. 'Low Carbon Society' project).
2. A study on the status quo for the application of material flow accounting for actual policy and business decisions (visualisation, actual impact, interviews with government experts), and the development of communication strategies to improve the perception of MFA among decision makers should be undertaken.

c. **Strategies in the manufacturing industry:** Cross-national conferences on business level like the German-Japanese PIUS conferences should be strengthened towards a systematic and continuous diffusion of resource efficiency and management tools. A systematic cross-evaluation and exchange of the Efficiency Agency North-Rhine-Westphalia, the German Material Efficiency Agency (Demea), the Japan Forum on Eco-Efficiency (AIST, JEMA and others) as well as analyses and the utilisation of the German material efficiency impulse programme are of further interest in that regard.

d. **Communicating resource efficiency:** Symposium on communication of resource efficient products and behaviours - learning from Japanese experiences such as Eco-Exhibition, Lifestyle on Health and Sustainability (LOHAS), other governmental campaigns.

e. **Lighthouses:** Coordinated strategies for market introduction and development beyond the Top Runner Programme for further product and technology fields. Establishment of alliances for progress, e.g. in the material field (new materials, maintenance and re-use technologies) and strategic dialogues in sectors featuring long-term opportunities and barriers, e.g. green purchasing, eco-design, construction & living, biomass utilisation, establishment of a Japanese-German Know how and experts pool for market development strategies.

f. **Regional approaches and finance programmes**, such as Eco Town Programme and Eco Profit: Exchange of regional/local experiences on working level and accompanying analyses. This could also include a feature on energy issues. Dialogue with German / European city and regional networks for sustainability (e.g. ICLEI Europe) and their Japanese counterparts**.**

g. **Developing countries:** Exploring joint interests and the possibility of joint efforts (e.g. policy dialogues, training programmes, joint funds) for improving resource management in developing countries, e.g. in the supply chain or in the end-of-life phase. One main case could be to improve circular economy policies and implementation in China.

h. **International initiatives:** Exploring common agendas of the two countries and joint advocacy efforts in international resource efficiency initiatives (e.g. International Panel for Sustainable Management of Natural Resources and its topic of sustainable metals management, 3R).

Forms of cooperation

- **Policy dialogue:** Establish a forum with a continuous dialogue between German and Japanese policy makers and related researchers with the aim of assessing and testing of each other's policy instruments (e.g. Germany: GPP, Japan: recycling) with hands-on help, expansion of project website in continuous online platform.
- **Business Dialogue:** Organising dialogues between German and Japanese business leaders to explore appropriate policy interventions.
- **Sustainability partners:** Long-term exchange partnerships / network of young researchers / professionals working on sustainability issues, conducting joint research and activities on the initiatives profiled and beyond.
- **Research dialogue** among research institutions, in the field of teaching (universities), between German Federal Environment Agency and National Institute for Environmental Studies, between enterprises and joint study programmes.
- **EU Action Plan benchmarking / dialogue**: Dialogue on Japanese best practice examples for the EU SCP Action Plan, ETAP, Resource Strategy and similar policy initiatives, coordination for other initiatives from EU member states.

Bilateral relations between Germany and Japan have a long tradition. In particular, the technical and scientific contacts between the two countries have steadily gained in importance during the 20th century. At the governmental level, this is documented in a series of agreements, dating back to the 1950s. Initially starting in special areas, including also environmental protection, the technology transfer is now largely related to the high-tech branches. A highlight in the recent past was the year „Germany in Japan" in 2005/06, whose opening event was an environmental conference.

Both countries are already leaders in resource efficiency and dematerialisation but – given many new and old practical constraints – they may benefit from a deepened and enhanced strategic cooperation to learn from each other in the domains of resource efficiency concepts, policies and technologies.

Concluding panel of "Resource Efficiency" Conference. From left: Harry Lehmann, Inge Paulini, Raimund Bleischwitz, Miranda Schreurs, Hans-Hermann Eggers, Wilhelm Meemken, Ulf Jaeckel, Atsushi Inaba

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Institute for Global Environmental Strategies (IGES): www.iges.or.jp

Japan Environmental Management Association for Industry (JEMAI): www.jemai.or.jp

Japan External Trade Organization (JETRO): www.jetro.go.jp

Japan for Sustainability: www.japanfs.org

Japanese-German Center Berlin: www.jdzb.de

Ministry of Economy, Trade and Industry (METI): www.meti.go.jp

Ministry of Environment of Japan (MoE): www.env.go.jp

National Institute for Environmental Studies (NIES): www.nies.go.jp/index.html

National Institute for Advanced Industrial Science and Technology (AIST): www.aist.go.jp/index_en.html

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